

## Death of Stars from Quranic Perspective and its Correlation to the Astronomical Context

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**Abstract:** Stars are celestial objects having their own life cycles. Stars are born, grow up, mature and eventually die. This paper is aimed to study the explanations for the death of stars according to the Quran and its correlation to the astronomical context. As a sacred source, it must be noted that the Quran is accepted as the ultimate source of truth. Contrarily, the exegesis of the verses of Quran (namely *tafseer*) given by *Mufasssireen* (experts who interpret the Quran) are dynamic, relative and changeable. The author employs literal analysis of the verses of Quran and its exegesis related with the dying process of stars. The verses and the exegesis then were correlated to the astronomical context. The results show the explanations of *Mufasssireen* on the related verses can be apprehended from astronomical context. Thus, the exegesis is still consistent with the astronomical perspective though different from literal descriptions.

**Key words:** Death of stars • *Al-nujum* • Islamic astronomy • Quranic perspective • Tafsir

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### INTRODUCTION

Stars are celestial bodies that have their own life cycles. Their lifetimes are much longer compared to the human being. All stars are born in large cold dense clouds of gas or called nebula clouds, but their death processes are different depends on their mass. According to Islamic outlook, it's a must to refer to the Quran, the Hadith (the tradition of Prophet Muhammad) and the views of Islamic scholars in comprehending any issues. There are a number of astronomical phenomena mentioned in the scripture of the Quran including the dying process of stars. This study aimed to clarify the perspective of Islam referring to the scripture and correlate it to the astronomical descriptions about how stars died.

**Methodology of Research:** This paper is based on library research. Content analyses of both perspectives were obtained from acknowledged writings. The explanations for the death of stars according to the astronomical context were primarily comprehended. Then, for Islamic perspective, data were collected from the Quran and the exegetical writings from *Mufasssireen* (experts who interpret the Quran). Finally, both perspectives were correlated which covered similarities, differences and integrated ideas from both perspectives.

### Stars in the Quran and Astronomical Explanation:

Generally, there are two aspects of stars in the Quran related to science and can be correlated to the astronomical context. *Firstly*, stars are mentioned in the Quran in several words embedded the meaning of

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the star itself and its features. The words are (1) *al-najm/al-nujum* (star/stars), (2) *al-buruj* (constellation), (3) *kawkab/kawakib* (star), (4) *masobih* (lamp), (5) *khunnas* and (6) *syi'ra* (Sirius). There are four verses of Quran contain the term of *al-najm* pronounced in a single form (*mufrad*) and nine verses in plural (*jamak*) which is *al-nujum*. *Al-najm* directly means a star. Another term, *al-buruj* is referred as group of stars in the skies or constellation. Constellations are mostly known as meant group of stars that configures a pattern in the sky such as Orion and Leo, or any areas in the definite celestial sphere that is marked with arbitrary boundary lines. According to *Mufasssireen*, it is concluded that there are four interpretations concerning the word *al-buruj*. Firstly, star(s) in a group means constellations or zodiac. Secondly, *al-buruj* brought the meaning as guard of the skies (*al-qusur*). Thirdly, *al-buruj* brought the meaning of an interesting creation. Fourthly, clusters of stars [1]. Another word is *al-kawkab* mentioned in the Quran is to describe stars as decoration of the skies [2]. *Al-khunnas* is defined as a star that is moving and not stationary. Some of *Mufasssireen* claimed that *al-khunnas* is a moving star. The term of *al-masobih* or lamp basically means shining. Stars are named as lamp because it shines [3]. There is only one Quranic verse mentioned *al-syi'ra* which is in the 49<sup>th</sup> verse of *Sura al-Najm* [4]. In astronomical context, *al-syi'ra* referred to the star named Sirius which was described astronomically as a binary star. A binary star is a pair of stars that revolves around each other due to the gravitational force exists between them [5]. At this point, it might be concluded that the specific term from the verses of Quran which can be referred as star is *al-najm*. While, the words of *al-kawkab*, *al-kawakib*, *al-khunnas*, *al-masobih* are referring to the features of the star itself; shining, moving and radiates its own light and heat [6].

**Secondly:** The Quran also has explained the role of stars. One of the role is providing direction for people to go at night in the desert or the sea. It's mentioned in following verses "*and marks and signposts; and by the stars (men) guide themselves*" [4]. Astronomical context stated the role of stars in daily applications; navigation, measurement, mapping, weather and aeronautics. The scripture also defines stars as lower heaven as stated in these verses, "*We have indeed decked the lower heaven with beauty (in) the stars*" and "*And we have, (from of old), adorned the lowest heaven with Lamps*" [4]. These phrases also indirectly illustrate the starry

night is the marvellous creation by God, The True Creator. At this stage, we can identify some of the understanding from the verses of the Quran is still consistently fit with astronomical context. However, the scripture also described the role of stars beyond of astronomical justification, for example, the stars also are a guard and protection from Evil which referred to the shooting stars. It is mentioned in several verses such as "*We have made such (Lamps) (as) missiles to drive away the Evil Ones, and have prepared for them the Penalty of the Blazing Fire*" and "*And (moreover) we have guarded them from every evil spirit accursed, But any that gains a hearing by stealth, is pursued by a flaming fire, bright (to see)*" [4]. This shows the scripture is not only provide a physical understanding in explaining the role of stars but also covers another metaphysical perspective which is beyond astronomical justification. The following writing will attempt to identify the Quran's perspective on stars life cycles and the dying process of stars.

#### **The Dying Process of Stars from Astronomical Context:**

The life cycles of stars consist of some stages regarding on the changes of their ageing. They born, grow up as a proto star, mature in main sequence and old aged stages before die [7]. However, different stars vary in term of colour, size and brightness. The bigger a star, the hotter and brighter it is. Hot stars are blue in colour while smaller stars are less bright, cooler and red in colour. Because they are so hot, the bigger a star actually has a shorter life span than the small and cool ones [7]. The life cycles of star depends upon its initial mass and chemical composition [8].

**Birth of Stars:** Stars are born in giant clouds of dust and gas. Sometimes the cloud shrinks because of gravity. The shrinking cloud becomes hotter until it is hot enough to produce a nuclear reaction at the core, then a star called is born. This stage is the earliest phase in their life cycle [9].

**The Main Sequence:** The second stage of star life cycles is the main sequence. All stars are in the main sequence after totally achieved the hydrostatic equilibrium. It is the inward force which tends to compress the star, balanced by the outward force due to the pressure [9]. All main sequenced stars are powered by the fusion of hydrogen into helium in their cores. High-mass main sequenced stars have shorter life spans than low-mass main sequenced stars [5].

**Old Star:** Before stars die, they become old stars. After the hydrogen fuel in the core of the star is used up, no new heat is produced and gravity will take over and the core of the star will shrink. This makes the very outside of the star “float up” and cool down, making star changed into a big and red body called a Red Giant or Supergiant star [9]. As the centre collapses, it becomes very hot again, eventually getting hot enough to start a new kind of nuclear fusion with helium as the fuel. Then the Red Giant shrinks and the star looks normal again. This does not last very long, though, as the Helium runs out very quickly and again the star forms a Red Giant. Red Giant star turns to second phase when helium shell burning begins around the inert carbon core after the core helium is exhausted. Condition for Supergiant stars (massive stars) in second phase begins when the fusion of heavier elements starts in the core after helium runs out. The stars fused many different elements in a series of shells while iron collected and clumped in the core [9].

**Death of Stars:** The last stage in stars life cycles or the way it finally dies depends on its mass. Low massed stars from Red giant stage turns to Planetary Nebula when outer parts drifted off into space and cool down. They are not able to fuse carbon or heavier elements into their core and ended their lives by expelling their outer layers and leaving behind a White Dwarf; or a carbon star [7].

For the massive stars in old age stage, iron cannot provide fusion energy, so it accumulates in the core until degeneracy pressure can no longer support it. Then the core collapse causes huge explosion called Supernova. The core collapse forms a ball of neutrons which may remain as neutron stars; super dense object, or collapse further to form a black hole [7].

## RESULTS

The study has identified several words from the verses of Quran can be correlated to the dying process of stars which are (1) *hawa* on verse “*By the Star when it goes down*” [10], (2) *tumisat* on verse “*Then when the stars become dim*” [1], (3) *inkadarat* on verse “*When the stars fall, losing their luster*” [1, 11] and (4) “*intatharat*” on verse “*When the Stars are scattered*” [12].

**Hawa - Fall Down, Goes down:** The word *hawa* can be found in verse “*By the Star when it goes down*”. The word refers to the end of stars’ life cycles. According to the contemporary Muslim scholar, ‘Abd al-Da’im al-Kahil [13], he stated that the word *hawa* is the most accurate to represent the end of a star life cycle (fall, *nihayah, saqata*), and not the word death (*maut*). He explained that the stars do not experience death because death means that stars cease to move, which is simply not the case, as stars turns to other forms as previously discussed. Therefore, he insisted that the word *hawa* or fall (*saqata*) is disintegrating into other objects are the most accurate. This describes the end of stars as currently occurring and not referring to the end such as on the Resurrection Day [13].

**Tumisat-Becoming Dim:** Some of *Mufasssireen* in their exegesis agrees that the term *tumisat* means becoming dim or loss of light. Al-Razi, among early Muslim scholars added essential information by saying that the term means burning [14]. According to al-Asfahani, the word *tumisat* means dying out undetected or losing light. Other *Mufasssireen* had different opinion when interpreting this as destruction.

Table 1: Correlation for the dying process of stars process between Quran and astronomical context

Quran	Astronomical Context	Low Mass Star	Massive Stars
Stars go down ( <i>Sura al-Najm</i> , verse 1)	Star collapse , run out from fuel hydrogen after that helium runs out in the core	Red Giant	Supergiant
Becoming dim ( <i>Sura al-Mursalaat</i> , verse 8)	Losing Light, when outer parts drift off into space and cool down	Planetary Nebula	-
Stars fall, losing their luster ( <i>Sura al-Takweer</i> , verse 2)	Not enough to fuse carbon or heavier elements in their cores and the end of their lives by expelling their outer layers and leaving a carbon	White Dwarf	-
Falling down and scattered ( <i>Sura al-Infitaar</i> , verse 2)	Iron cannot provide fusion energy, so it accumulates in the core until degeneracy pressure can no longer support it. Then the core collapse causes huge explosion	-	Supernova

Table 2: Correlation for the remnant stars between Quran and astronomical context

Characteristic of the Remnant Stars		
Quran	Remnant Stars	Astronomical Context
“He is The Lord of Sirius (the Mighty Star)” – Verse 49, Sura al-Najm	White Dwarf	Sirius B is among White Dwarf Stars. Astronomy found that White Dwarf is commonly in Binary Star
“Stars with piercing brightness” – Verse 1-3, Sura al-Tariq	Pulsating Neutron Stars	The star highly magnetized. Rapidly spinning and their energy found only by radio source
“Invisible, moving and sweeping” – Verse 15-16, Sura al-Takwir	Black Hole	They are the graveyard of the stars; swallow and sweep everything coming close to it even light and they are swimming in the space. As they have very enormous gravity they attract even light and do not reflect it and do not allow any light to leave, so, they are invisible

According to Arabic Dictionary, Ibn Manzur said in his book, “Thus the destruction of a planet is by its loss of light” [15]. Both views from *Mufasssireen* and Arabic linguists showed the strongest view on this word means loss of light.

**Inkadarat-Stars Fall, Losing Their Luster, or Intatharat - Stars Are Scattered:** In discussing the word *inkadarat*, Ibn Kathir narrated all the views that synonymize *inkadarat* with *intatharat* which means falling. This kind of interpretation is not really accurate because the two words are different. It is undeniable that Arabic dictionary and rhymes did not justify clearly the difference of the words. From the views of various scholars, it most likely that *indakarar* means changing and falling that occurred on the star and it starts to fall down while the word *intatharat* means falling down and scattered [16].

Table 1 shows correlation both perspectives on how the death of stars occurred. The correlation showed the understanding from the verses of the Quran can be elaborated in astronomical context. The explanations from the verses of Quran can be arranged step by step to explain the dying process of stars according to the arrangement of Sura begin from *Sura al-Najm* (53:1), *Sura al-Mursalaat* (77: 8) then *Sura al-Takwir* (81:2) and finally *Sura al-Infitaar* (82:2). Though the verses of Quran contain the understanding on the dying process of stars, the astronomical context can be employed to elaborate the understanding in the empirical manner.

Table 2 presents the remnant stars after the dying process of stars. The understanding from verse 49 *Sura al-Najm* can be correlated to the white dwarf from astronomical context [5]. In *Sura al-Tariq* from verses 1 to 3 according to ‘Abd al-Da’im al-Kahil, the word “*al-thaqib*” might refer to the remnant stars after explosion (supernova) which is the neutron star. This opinion differs with other earlier scholars who tend to

interpret it as the Sun and Saturn. Early *Mufasssireen* such as Al-Jauhari and Qatadah defined it as ‘shining’, meanwhile Al-Najjar had the same opinion with al-Kahil in this matter [17].

The Quran also explained the black holes based on their characteristic on verses 15-16 *Sura al-Takwir*. Early *Mufasssireen* just interpret this verse as moving stars but contemporary Muslim experts in exegesis like an-Najjar and al-Kahil explain about this matter. They concluded the three words which are *al-khunnas* means hidden or invisible, *al-Jawar* means always moving and expanding and *al-kunnas* refers to an attraction force or vacuum cleaner [17]. All of these words have its relations to the black hole itself; it can’t be seen, no one knows what is behind it, it always expands and it has great gravitational force [5].

## CONCLUSION

The obtained results show the understanding from the verses of Quran related to the several aspects of stars; literal meaning, features, roles and dying process, is still consistent with astronomical context. Astronomical context still can provide detailed explanations empirically to elaborate the understanding though it is limited to the physical dimension of stars. Another dimension which is the metaphysical perspective is beyond of astronomical context. The study suggests the exegesis of previous *Mufasssireen* related to the dying process of stars have to be updated with contemporary context using astronomical approach.

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